

Breakthrough technologies to accelerate breeding and strain improvement in biological production for a sustainable society

Development of hologenomic selection methods for simultaneous improvement of crops and crop microbiome

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Summary :

Ancestral species of crops were originally capable of living in symbiosis with the microbiota. However, it is believed that this ability has been severely degraded with the introduction of modern agriculture, which requires large amounts of fertilizers and pesticides, as well as cultivation. In order to utilize the crop-microbiota for agricultural purposes, it is necessary to make genetic improvements in crops to maximize their symbiotic effects. It is also necessary to discover and realize the optimal species composition of the microbiota. However, there are very many combinations of crop genotypes and microbiota, so that it is essential to establish the technological basis for a system that can efficiently search for a promising combination among many combinations. In this R&D project, we propose a new breeding method to improve the symbiotic relationship between crops and microbiota simultaneously based on the hologenome, which combines crop genome and microbiota metagenome.

